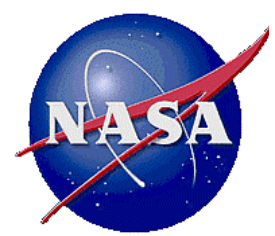


USS IWO JIMA Mishap

A Set-up for Failure

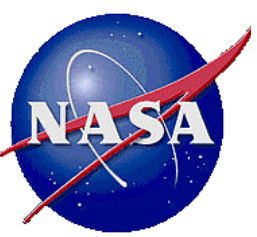


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What Happened

- **October 1990: USS IWO JIMA Amphibious Assault Ship Deployed to Persian Gulf, Operation DESERT SHIELD**
- **Docked at Bahrain shipyard for emergent repairs**
- **As ship was leaving port- one hour after propulsion plant brought on line- bonnet fasteners for a 4" valve supplying steam to Ships Service Turbine Generator failed catastrophically**
- **850 degree superheated steam at 600 psi escaped into manned compartment**
- **Nine sailors killed instantly, one more fatally injured**



Proximate Cause

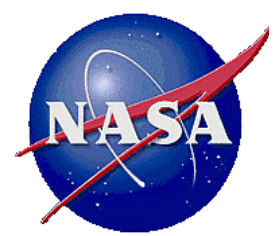
Unauthorized substitution of black oxide coated brass fasteners (BOCBF) for high strength steel fasteners in the valve



Alloy Steel Nuts

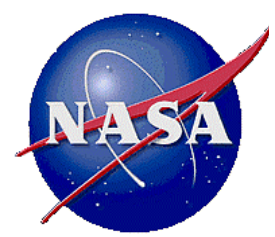


Black Oxide Coated Nuts
(not actual BOCBF)



The Set-Up

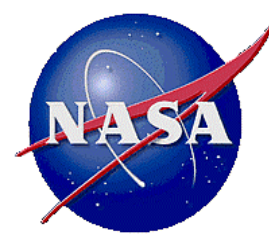
- **BOCBF are virtually identical in appearance to high strength steel fasteners. Coating served no functional purpose, but was applied in order to standardize common parts**
- **Fasteners are readily available and easily interchangeable**
- **Brass exhibits significantly diminished strength properties from steel under elevated temperatures**
- **Manufacturer Logo on BOCBF box: “Fasteners for High Strength Applications”**
- **Work performed by Foreign nationals with limited English**
- **Result: Failure to install Level I fasteners (required for superheated steam applications)**



Contributing Factors

- Repair specifications did not identify fastener part numbers
- Ships Force did not provide contractor Standard Parts List
- Inadequate supervision for installation of Level I material
- No evidence that Government hold point inspections were performed
- Inadequate knowledge of Level I material requirements
 - Segregation from non-Level I
 - Segregation of look-alike parts
 - Markings
 - Color coding
 - Documentation





Corrective Actions/Lessons Learned

- Identified all BOCBF substitution hazards on Navy ships
- Mass inspection of in-service fasteners (scrape or magnet)
- Purged stocks & replaced with shiny brass or monel fasteners
- Revise parts lists to flag Level I fasteners and include warning notes
- Training curricula modified to include Level I awareness (engineers and mechanics)
- Fastener Selection training video disseminated Navy-wide